

## **Abstract**

Prompted by continuing concern that timber-based commodities are becoming increasingly scarce, this paper presents information on changes in real prices (prices deflated by the general producer price index) of timber commodities as potential indicators of economic scarcity. Data updating previous studies are shown for sawlog stumpage, delivered sawlogs, and lumber; pulpwood stumpage, delivered pulpwood, and woodpulp; and delivered veneer logs and plywood. Most real prices were constant or increased somewhat during the two decades after World War II. Prices have increased more rapidly since the economic recession ending in 1961. Declining housing demand caused a decrease in real prices for lumber and plywood between 1979 and 1980.

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# Trends in Economic Scarcity of U.S. Timber Commodities

By

Kenneth Skog, Forester  
and  
Christopher Risbrudt, Economist

## Introduction

Scarcity of natural resources has been of concern to industrial societies since Malthus developed his theory of population growth and resource use in the late 18th century (3).<sup>2</sup> Barnett and Morse, in 1963, tested the widely held premise that natural resource commodities are becoming more economically scarce (7). They concluded that of all major natural resource commodities—agricultural, mineral, and timber—only timber commodities were increasing in economic scarcity. In particular, sawlogs have shown consistent increases in economic scarcity since the late 1800's.

Data were prepared for the Barnett and Morse study by Potter and Christy (6) and subsequently updated by Manthy to 1973 (4). This paper extends and expands these data series on timber commodities. Specifically, information will be presented on one indicator of economic scarcity—trends in real prices (prices deflated by the general producer price index).

## Economic Scarcity

Trends in deflated prices of timber commodities are only one possible indicator of changing timber scarcity.

In general, changing economic scarcity of timber commodities results from changes in all factors that determine the ability of a society to satisfy demands for timber products. Changes in limited physical supply of timber (physical scarcity) join with changes in technological production capabilities, changes in ability to organize production and distribution, and changes in demand for timber products to effect changes in economic scarcity. Smith (7) has identified two general approaches—structural and outcome—to analyze the role of natural resources in satisfying economic demands:

- The structural approach examines the role of natural resources in each production process that generates goods and services and appraises demand for these goods and services. This information is used to model the functioning of perfect markets in judging scarcity of natural resources.
- The outcome approach assumes it is possible to trace scarcity by examining the outcomes of all the complex processes approximated by the perfect market model of the structural approach. Fisher has proposed that an outcome measure of scarcity should have just one essential property: "It should summarize the sacrifices, direct and indirect, made to obtain a unit of resource." (2).

One outcome measure of economic scarcity is the relative market price (deflated price) of a resource commodity. But relative prices may be faulty as measures, if they do not account for *all* costs, direct and indirect, required to obtain a unit of resource. Direct costs of

<sup>1</sup> Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

<sup>2</sup> Italicized numbers in parentheses refer to literature cited at the end of this report.

producing and extracting a resource—capital and labor costs—are accounted for in a market setting price. But indirect costs such as the perceived value of foregoing future resource use may not be fully included in market price. The future value of standing timber may be undervalued and result in too low a present market value. Indirect costs such as consumption of common property resources are not accounted for in market exchanges. For example, the value of a wilderness area foregone may not be reflected in the stumpage price for timber harvested from an area.

The use of market prices to trace economic scarcity is based on the premise that each price correctly reflects society sacrifices, present and future, resulting from current natural resource production and use.

The remainder of this paper is devoted to discussing characteristics of price series for timber commodities as possible measures of economic scarcity.

The trends in real or deflated prices presented here will indicate economic scarcity with respect to the economic scarcity of a package of goods measured by a deflation index. The deflation index used is the aggregate producer price index for wholesale products.

## Markets for Timber-Based Commodities

Economic scarcity can be studied in each where buyers must incur costs (make sacrifices) a timber commodity. Timber commodities are at several market levels. A price is in each market. Market levels may be sequence, along with stages in the general process, from resource, as found in nature, t (5). A simplified marketing sequence is Figure 1. Economic scarcity of timber commodities may vary from one commodity form to another

(sawlogs, pulpwood, veneer logs), from one market level to another (stumpage, delivered, final product), from one species to another, and from one geographic region to another.

Table 1 shows the price series presented here. For example, trends in deflated stumpage prices will indicate changes in relative economic scarcity of timber resources at the stumpage market level. These real price trends indicate the changing sacrifice buyers are willing to make, as well as the changing costliness of production and foregone use opportunities perceived by sellers. Trends in deflated prices for delivered sawlogs, pulpwood, and veneer logs will also reflect changing efficiency of harvesting and hauling sawlogs to mills in addition to the changing price of stumpage. Trends in deflated prices of products (lumber, woodpulp, plywood, and veneer) also include the effects of the changing efficiency of the industries which convert delivered commodities to products. The influence of changing demand for wood products relative to substitutes will be felt at all three market levels.

Prices for packages of commodities (aggregate prices) are constructed for delivered sawlogs, delivered pulpwood, delivered veneer logs, and all delivered timber commodities. The aggregate price in a given year is intended to indicate the price to purchase the combination of timber species produced in 1967. Because price series are not available for every species of timber in every geographic region, available price series are used to represent general price trends for a species in several states. For example, the average price for Louisiana southern pine sawlogs is used to represent the price for all southern pine. In the long run, trends displayed by the available price series are assumed to match the average for the region they represent. Trends in aggregate prices are intended to indicate the relative economic scarcity of the package of timber commodities produced in 1967.

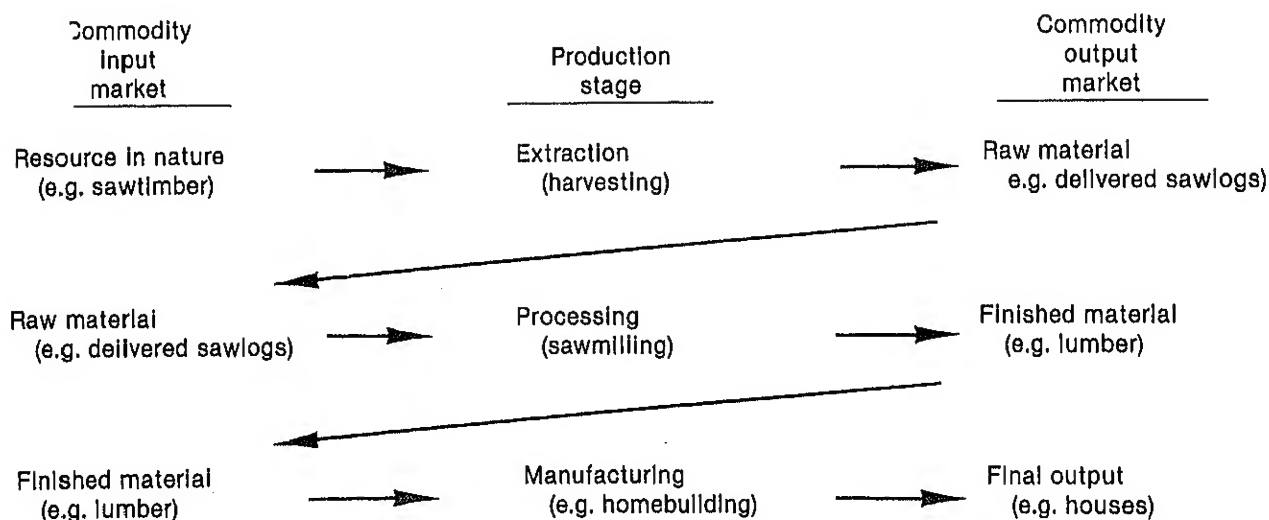


Figure 1.— Generalized marketing sequence for forest products at three levels.

Table 1.—Selected categories of deflated prices and price indexes for timber-based commodities

Market level			
Commodity	Stumpage	Delivered to mill	Product <sup>3</sup>
Sawtimber and sawlogs	Douglas-fir <sup>1</sup> Southern pine <sup>1</sup> Ponderosa pine <sup>1</sup> Eastern hardwoods <sup>1</sup>	All sawlogs <sup>2</sup> Hardwood sawlogs <sup>2</sup> Softwood sawlogs <sup>2</sup>	All lumber Hardwood lumber Softwood lumber
Pulpwood	Louisiana southern pine Louisiana hardwoods Wisconsin pine Wisconsin spruce Wisconsin aspen Wisconsin hemlock New Hampshire spruce-fir New Hampshire hemlock	All pulpwood <sup>2</sup> Southern pine Wisconsin pine Wisconsin spruce Southern hardwoods Wisconsin aspen Western softwoods Western softwood chips	Woodpulp
Veneer logs and veneer or plywood		All veneer logs <sup>2</sup>  All hardwood veneer logs <sup>2</sup> All softwood veneer logs <sup>2</sup> Douglas-fir Wisconsin hard maple Wisconsin yellow birch Wisconsin white and red oak Wisconsin walnut Illinois white oak Indiana walnut Louisiana gum	All plywood and veneer Hardwood plywood and veneer  Softwood plywood
Naval stores			Turpentine, rosin
All timber commodities		Aggregate timber <sup>2</sup> commodity price index	

<sup>1</sup> Prices for sales from National forest land.

<sup>2</sup> Prices for the 1967 mix of commodities produced.

<sup>3</sup> Price indexes for the 1972 mix of products produced.

Aggregate prices are also presented for certain timber products: lumber, woodpulp, and plywood/veneer. These are price series for the 1972 combination of timber products produced.

### Highlights of Timber Commodity Price Trends

This section summarizes trends in timber commodity prices over several decades ending in 1979 or 1980. Comparisons are made among price series, particularly among timber commodity forms (e.g., sawlogs, pulpwood, veneer logs) and among market levels (stumpage, delivered to mill, product).

#### Softwood Sawlog and Lumber Prices<sup>3</sup>

Softwood sawlog stumpage has shown the greatest long-term increase in price<sup>3</sup> of any timber commodity. This increase has been largely due to increases in Douglas-fir stumpage price. Douglas-fir stumpage sold

from National forests has increased in price an average of 7.5 percent per year since 1920 (fig. 2A). Price increases for southern pine and ponderosa pine on National forests have been somewhat slower, averaging 4.3 percent for southern pine (fig. 2B) and 5.4 percent for ponderosa pine (fig. 2C). The trend in increasing price has been most consistent for Douglas-fir stumpage. Trends in prices for southern pine have been more erratic, with declines in price recorded in the 1950's and early 1960's. Southern pine stumpage prices resumed their upward trend in the early 1960's and the trend continued in the 1970's.

Since the general economic recession ending in 1961, stumpage prices have increased faster than the long-term rates. Over the period 1961 to 1979, Douglas-fir price increased an average of 10.2 percent per year, southern pine increased an average of 4.8 percent per year, and ponderosa pine increased an average of 12.2 percent per year. These recent price increase rates would support the view that softwood stumpage is currently increasing in economic scarcity even faster than in the past.

<sup>3</sup> All price references refer to prices deflated by the 1967 producer price index.

Price increases for all delivered softwood sawlogs have not been as great as price increases for major species of softwood stumpage. The price of a representative mix of delivered softwood sawlogs increased an average of 2.9 percent between 1947 and 1979 (fig. 3A). This index was weighted heavily in favor of delivered southern pine and Douglas-fir sawlog prices. These species groups were given 66 percent of the weight in forming this index. During the late 1950's and early 1960's, this aggregate index was almost constant. But after the 1960 recession, price increases resumed; the index increased an average of 4.0 percent per year between 1961 and 1979. Even though price increases resumed, they do not reflect the full 5-12 percent annual increase rate of Douglas-fir and southern pine stumpage over the same period. Other species of softwood sawlogs increased in price more slowly.

The producer price index for softwood lumber production is not directly comparable to the aggregate delivered softwood sawlog index because the softwood

lumber index traces the price of the 1972 mix of softwood lumber species produced rather than a 1967 mix. The softwood lumber index has shown an increase of 1.4 percent per year since 1950 (fig. 3B). Between 1950 and 1961, the index was nearly constant. But following the 1960 recession through 1979, softwood lumber increased in price an average 3.1 percent per year. This increased rate is somewhat less than the 4.0 percent annual increase rate for the 1967 mix of softwood sawlogs.

Softwood stumpage, delivered sawlogs, and lumber have all shown increases in prices in the long run with increases being most pronounced since 1961. Since 1961, stumpage has increased 5-12 percent annually for major species, sawlogs have increased 4.0 percent annually, and lumber has increased 3.1 percent annually. These increases occurred over a period when roundwood use for lumber was increasing less than 1 percent per year (table A-11). The recent decline in housing demand has caused a decrease in 1980 prices for softwood stumpage and lumber from 1979 levels.

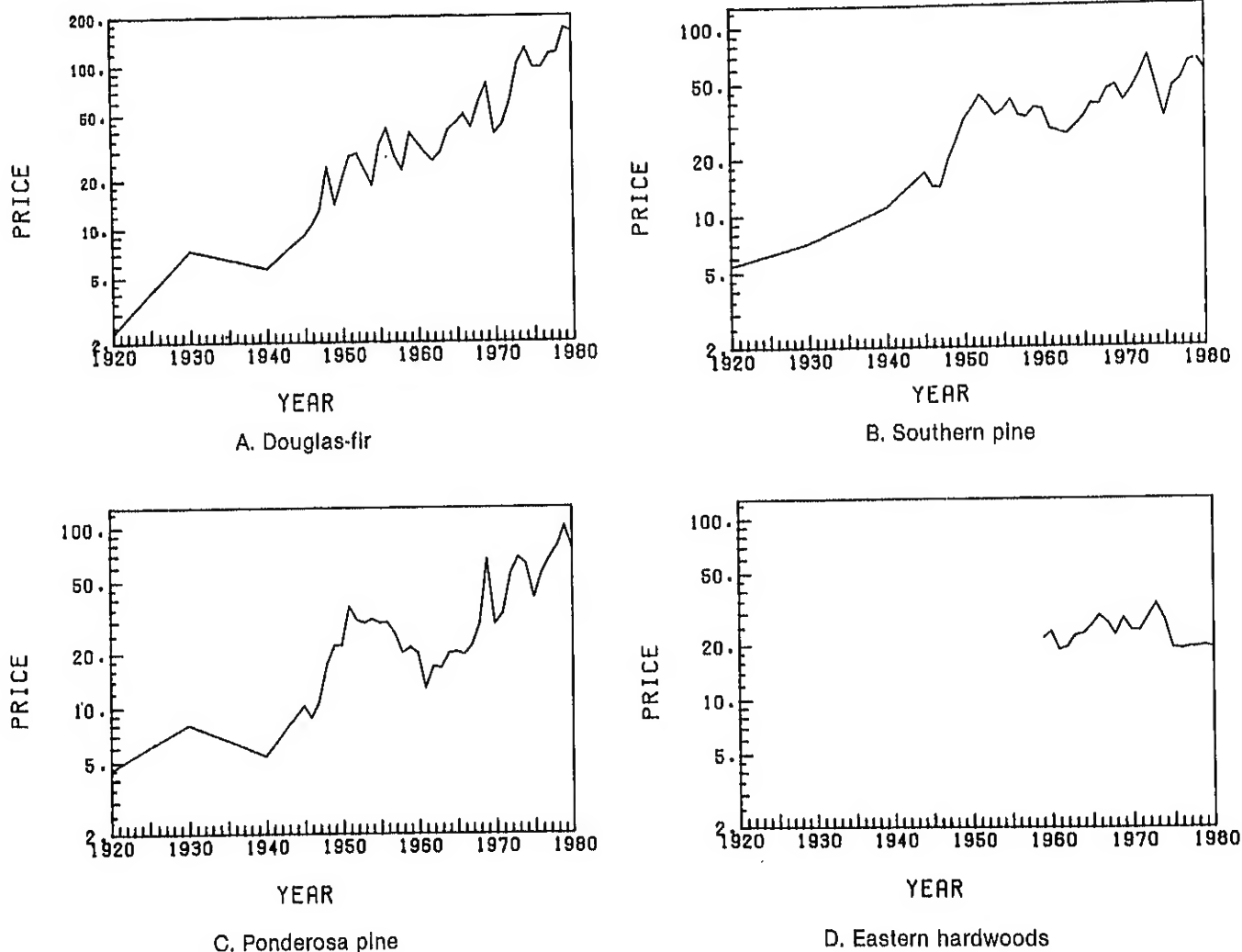
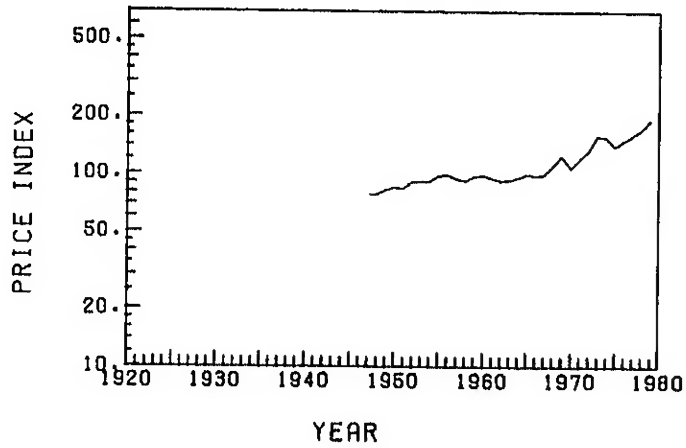
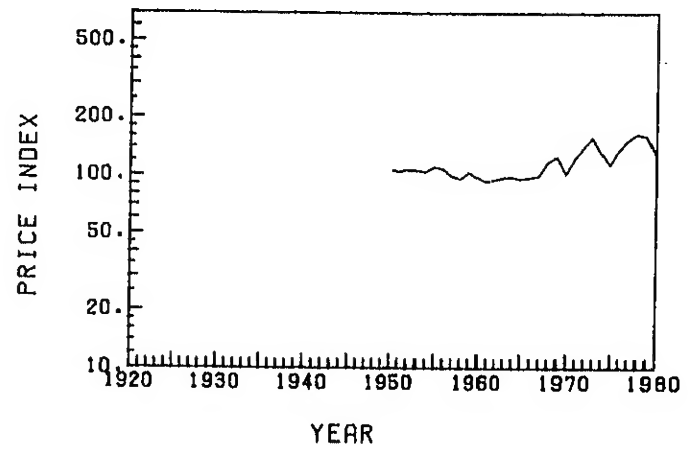


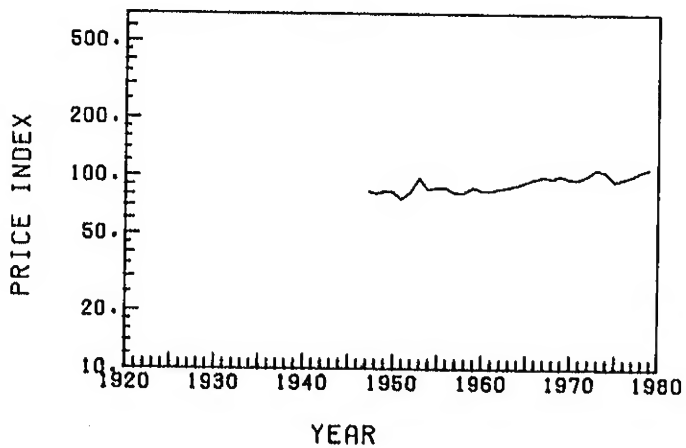
Figure 2.—Sawtimber stumpage prices for National forest timber, for individual species (1967 dollars per 1,000 board feet). (Ref. table A-1)



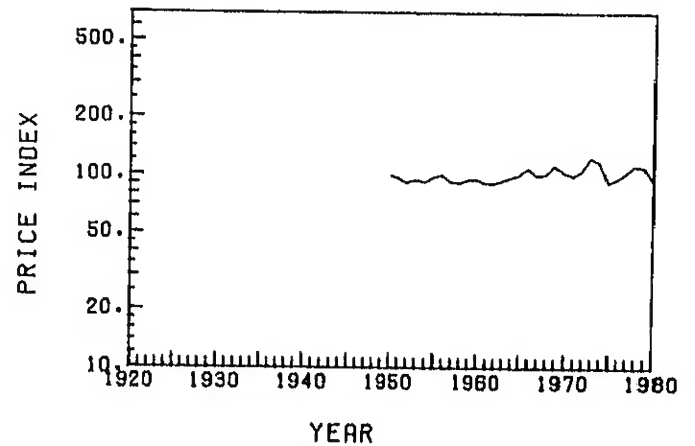
A. Softwood sawlogs



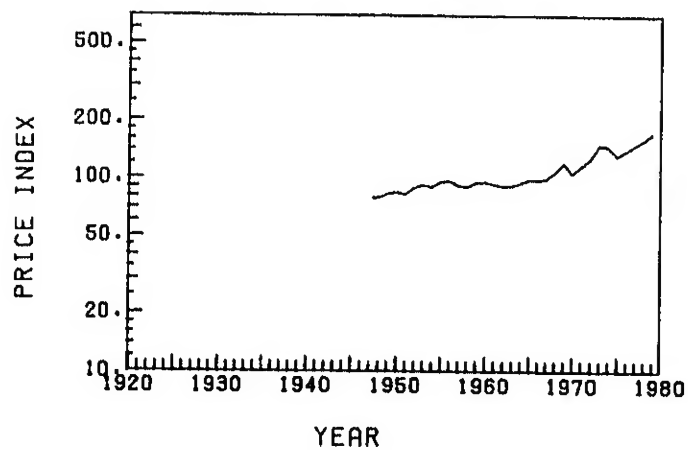
B. Softwood lumber



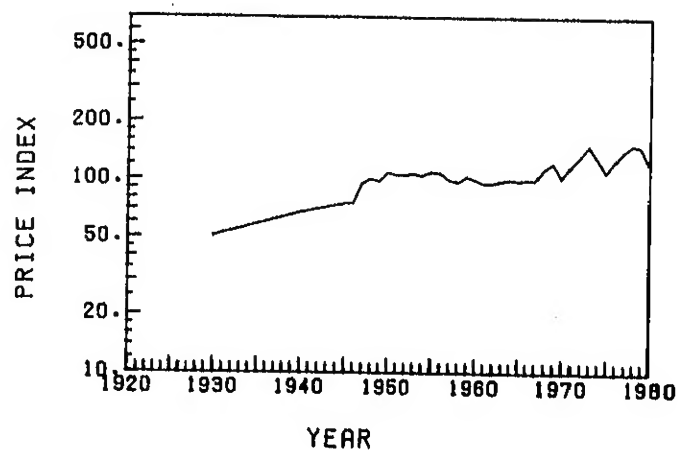
C. Hardwood sawlogs



D. Hardwood lumber



E. All sawlogs



F. All lumber

Figure 3.—Price Indexes for delivered sawlogs and for lumber (deflated—1967= 100). (Ref. tables A-2, A-3)

### Hardwood Sawlog and Lumber Prices

Hardwood stumpage and delivered sawlog prices have shown very little increase since 1947 when compared to softwood stumpage and delivered sawlog prices. Stumpage prices for eastern hardwood sawlogs from National forests increased at an average rate of 1.4 percent per year between 1959 and 1974 (fig. 2D). But prices dropped sharply after 1974. Over the period 1959 to 1980 there has been virtually no change in eastern hardwood stumpage price. This hardwood stumpage price series has certain weaknesses. It does not reflect the price of a fixed mix of sawlog species nor does it reflect the price of a constant quality of sawlogs. Therefore, slow price change may be due to declining quality of stumpage or to increased purchase of cheaper species.

The need for stable species composition and stable sawlog quality is satisfied to a large degree in the construction of the delivered hardwood sawlog index. Where available, prices for a single quality of sawlog are used and the 1967 quantity mix of species produced is maintained throughout the series. This delivered hardwood sawlog price index shows virtually no change over the period 1947 to 1961 (fig. 3C). This constancy is also reflected in the price series for hardwood lumber which increased a negligible amount over the same period (fig. 3D). From 1961 to 1979 prices increased both for delivered hardwood sawlogs and for hardwood lumber. These series increased at 1-1.5 percent per year. These price increases are considerably less than the 4.0 percent annual increase for delivered softwood sawlogs and 3.1 percent annual increase for softwood lumber over the same period. Since 1979, declining lumber demand has resulted in lower hardwood lumber prices.

### Pulpwood and Woodpulp Prices

Pulpwood stumpage prices are shown in figures 4 and 5. Both hardwood and softwood stumpage have, in general, shown price declines. The largest decline in prices since 1961 was in Wisconsin for spruce, 4.5 percent per year. Pine and hardwood pulpwood stumpage prices have been relatively stable, or declining slowly in Louisiana.

In contrast to stumpage prices, delivered prices have shown no general trend (fig. 4B and 5B). Prices have varied, sometimes by as much as 40 percent over 2 years (Wisconsin aspen, 1949-1951), but in the long run delivered prices have not declined as have stumpage prices. However, movements in delivered pulpwood prices are not completely independent of stumpage prices. Wisconsin pine prices for delivered pulpwood declined by about \$4 (1967 base) between 1970 and 1975, while stumpage prices declined by \$2 (1967 base). In contrast, Louisiana pine pulpwood stumpage declined between 1968 and 1974, while delivered prices increased slightly. A similar decline occurred for Wisconsin hardwood pulpwood from 1969 to 1978.

Western softwood pulpwood delivered log prices were generally declining through 1973 (fig. 4E). A large increase in the next 2 years was due to the slump in the housing market. With decreased housing construction, lumber production dropped along with the jointly produced residues. The disappearance of these residues, on which western pulp mills are heavily dependent, drove up the price of pulpwood. After lumber production recovered, prices started falling again. Western softwood delivered chip prices generally increased in price since 1950 and in the 1970's are comparable to log prices (fig. 4E).

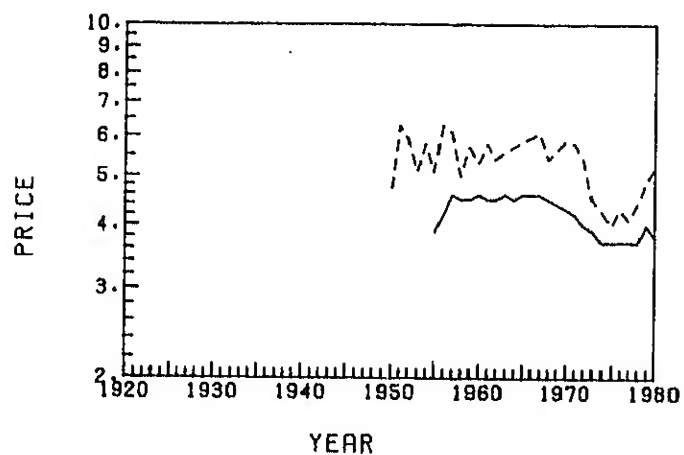
Figure 5D shows that trends in the woodpulp producer's price index are approximately parallel to those of the average western softwood pulpwood prices. The jump in prices from 1973 to 1975 in woodpulp was 73 percent, while the increase in western pulpwood prices was 102 percent. The difference is probably due to eastern pulpwood prices not being affected as much by the 1974-75 housing slump, and the fact that other production inputs did not increase greatly in price. Except for the increases in the middle 1970's, the trend in the woodpulp producer's price index has been downward.

The weighted average price for all delivered pulpwood is given in figure 5C. Except for the late 1940's and the middle 1970's, the average price has been nearly constant. The price trend would indicate no serious problem with increasing scarcity for the 1967 mix of delivered pulpwood.

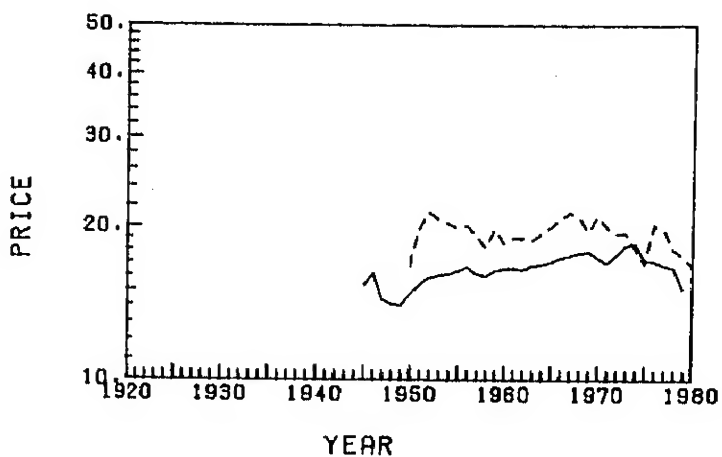
### Veneer Log and Plywood Prices

Delivered hardwood veneer logs have generally shown rapid increases in price since 1950. Representative prices from Wisconsin, Illinois, and Indiana are shown in figure 6. Walnut prices have shown the greatest annual increase ranging from 5 percent in Wisconsin to 8 percent in Indiana over the period 1950 to 1979. But since 1970, walnut price increases have slowed markedly. Oak veneer log stumpage prices have been less consistent from state to state than walnut prices. Illinois oak declined in price from 1950 to 1964 but subsequently shot up at the rate of almost 12.5 percent per year through 1979. Wisconsin oak, in comparison, increased a modest 1.2 percent per year through 1972. This price has since doubled and then declined slightly. Other delivered veneer log price series from Wisconsin have shown mixed trends. Hard maple recorded a slow increase to 1975. Since then price has been relatively stable (fig. 7A). Yellow birch, in contrast, recorded a relatively stable price to 1967 and began a decline lasting to 1975.

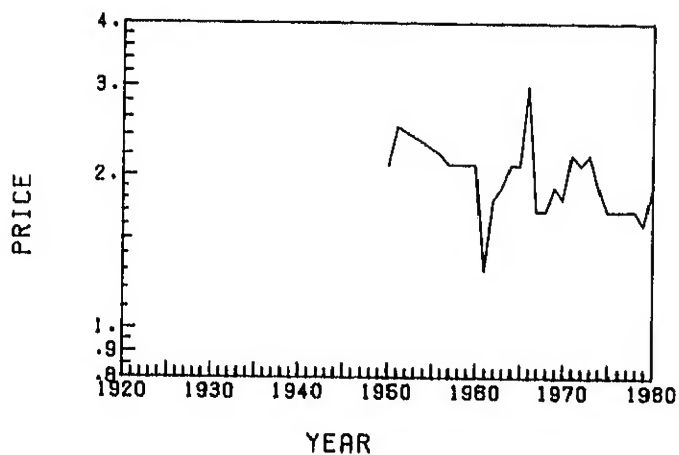
Gum, which was used to produce 44 percent of the hardwood plywood in 1967, recorded steady price increases averaging 1.5 percent per year from 1950 through 1969, as represented by Louisiana gum (fig. 7B). Since 1969, price has been constant to declining.



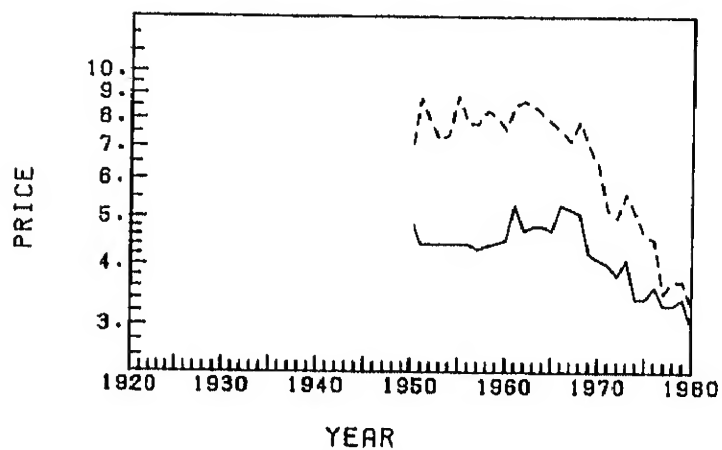
A. Pine stumpage  
— Louisiana southern  
--- Wisconsin red and white



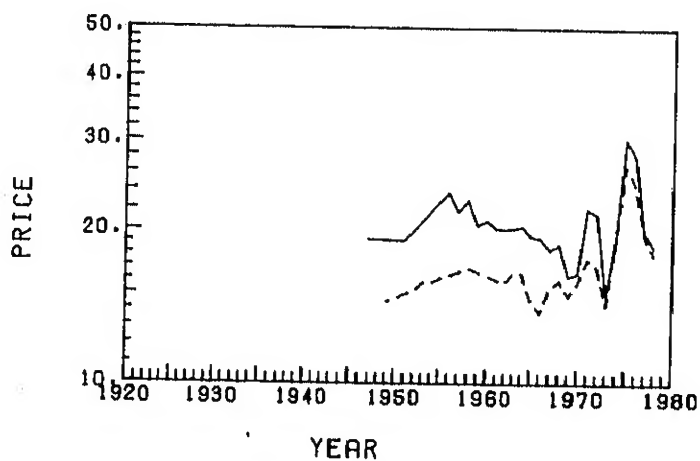
B. Pine delivered  
— Southern  
--- Wisconsin red and white



C. Softwood stumpage  
— New Hampshire hemlock



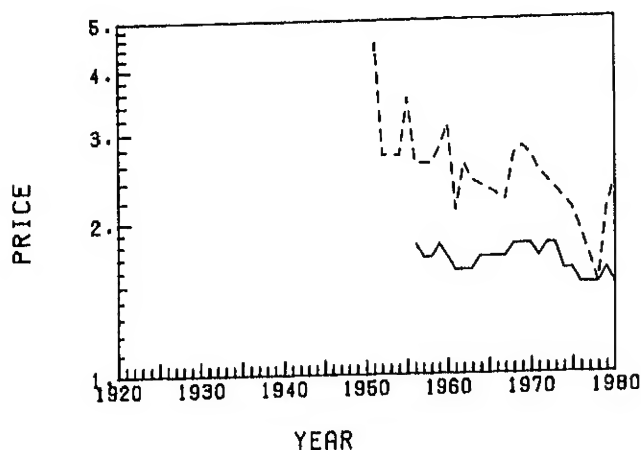
D. Softwood stumpage  
— New Hampshire spruce-fir  
--- Wisconsin spruce



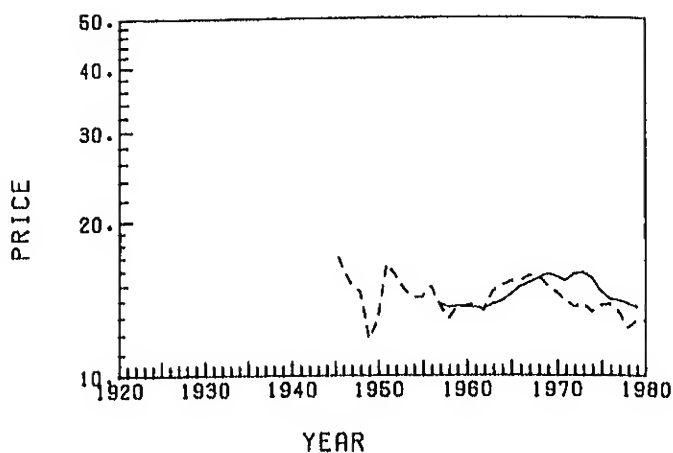
E. Western softwood  
— Logs  
--- Chips

Figure 4.—Softwood pulpwood prices—stumpage or delivered (1967 dollars per cord). (Ref. tables A-4, A-5)

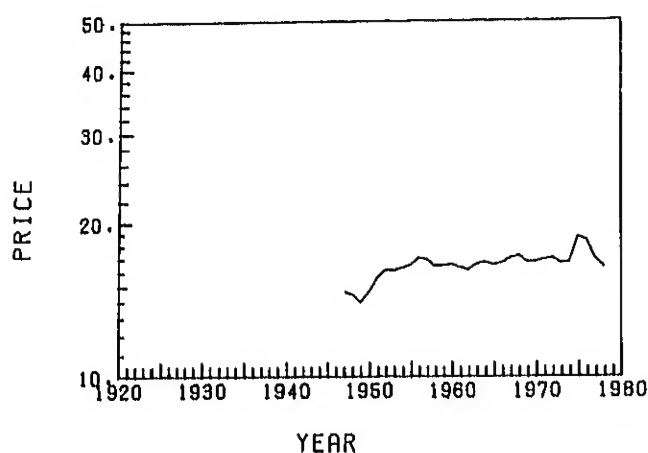




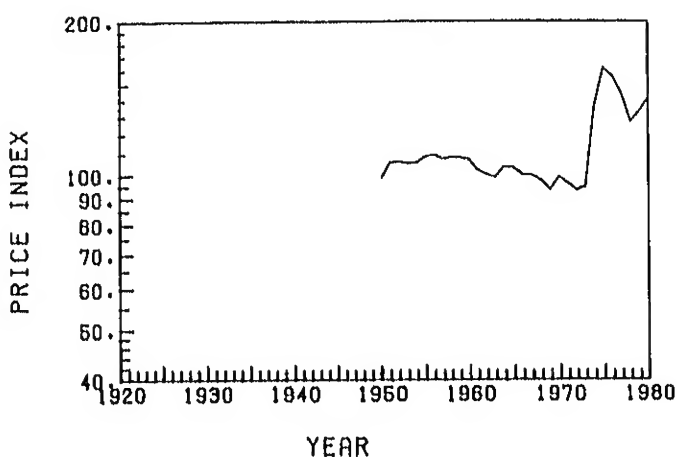
A. Hardwood stumpage  
— Louisiana hardwoods  
--- Wisconsin aspen



B. Hardwood delivered  
— Southern hardwood  
--- Wisconsin aspen



C. All pulpwood delivered



D. Woodpulp producer's price  
(1967 = 100)

Figure 5.—Prices for hardwood pulpwood. All pulpwood and woodpulp (1967 dollars per cord). (Ref. tables A-4, A-5, A-6, A-10)

The slowly increasing and subsequently constant gum prices are a strong influence in the aggregate delivered hardwood veneer log price index (fig. 7C). The 1967 mix of veneer logs represented in this index recorded a steady increase in price averaging 4.3 percent per year from 1950 to 1967. Since 1967, the index has been constant to slightly increasing.

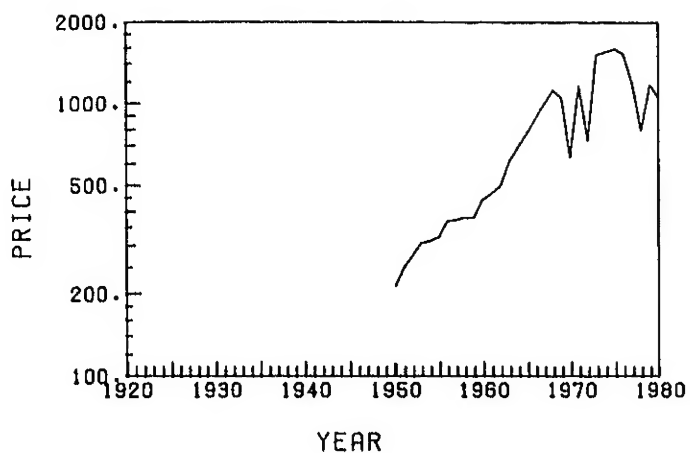
Hardwood plywood prices, which reflect the cost of core material and glue as well as veneer faces, have declined steadily from 1950 to 1979 at an average rate of 1.8 percent per year.

Softwood veneer markets, unlike hardwood veneer markets, are dominated by a single veneer species, Douglas-fir. In 1967, 85 percent of softwood veneer logs

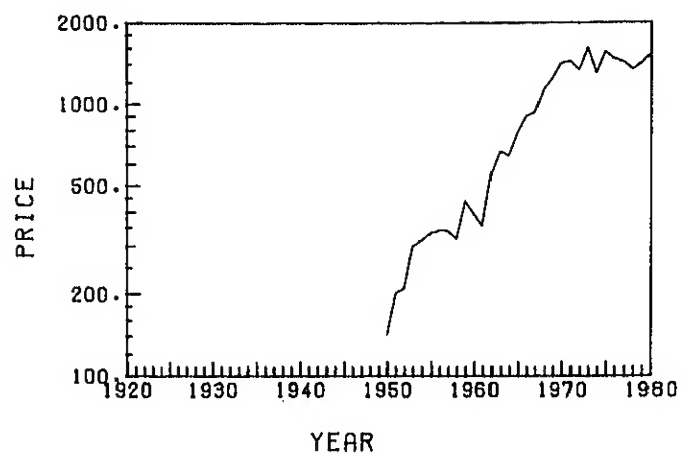
were Douglas-fir, which declined in price from 1950 to 1963. But from 1963 to 1979, the price increased 6.3 percent per year. In comparison, Douglas-fir sawlog stumpage increased at 10.2 percent per year from 1961 to 1979.

Softwood plywood price changes indicate plywood is not increasing in scarcity as fast as softwood veneer logs. Softwood plywood decreased in price substantially from 1950 to 1967 (fig. 7E). From 1967 to 1979, it increased at 2.6 percent per year, well below the rate of Douglas-fir veneer logs, at 7.1 percent per year. Due to the recent decrease in housing construction 1979 and 1980 prices have declined.

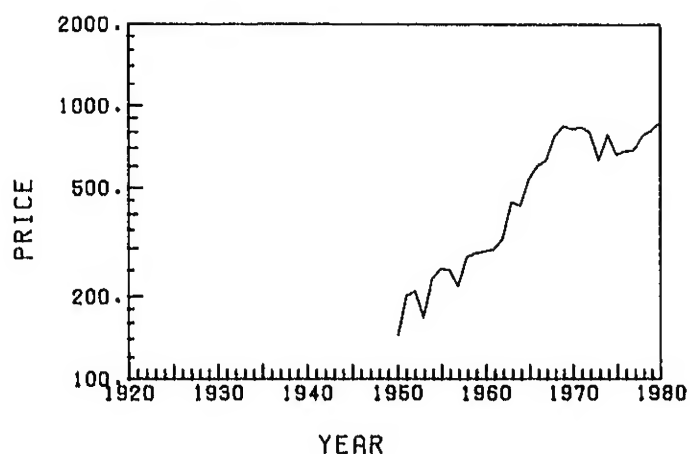
The aggregate delivered veneer log index shown in figure 7D shows the price of a representative mix of



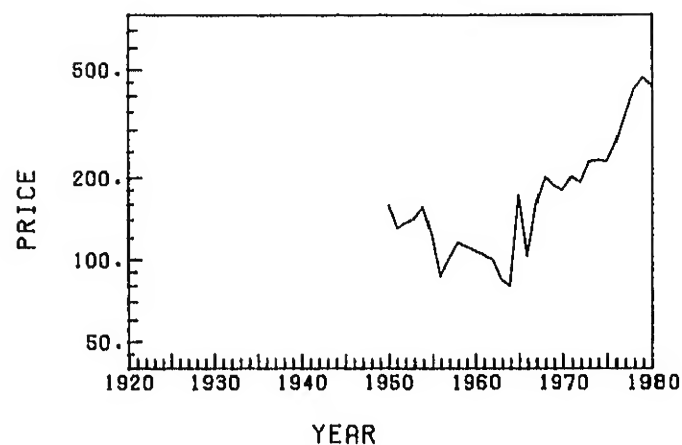
A. Walnut—Wisconsin



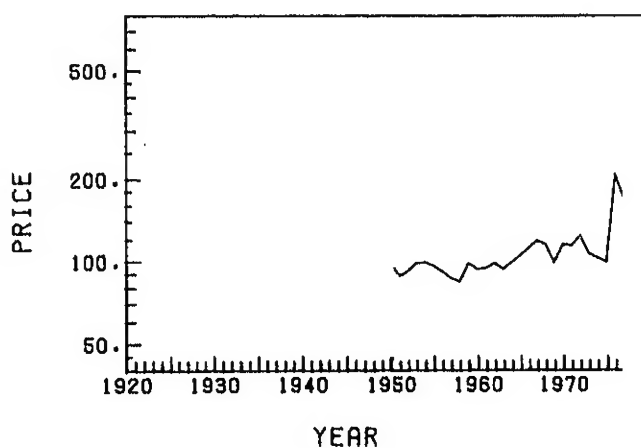
B. Walnut—Indiana



C. Walnut—Illinois

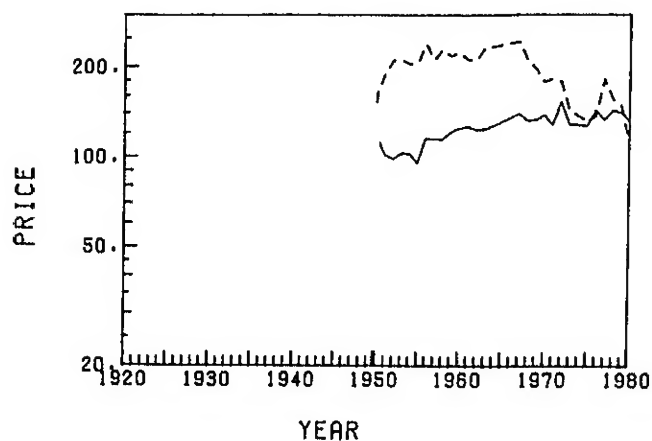


D. Oak—Illinois

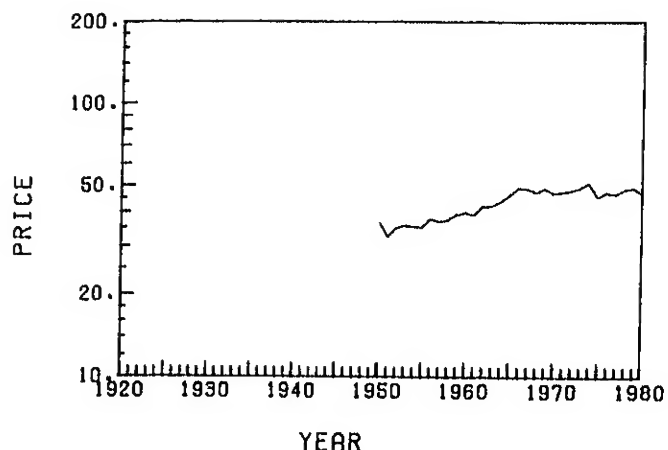


E. Oak—Wisconsin

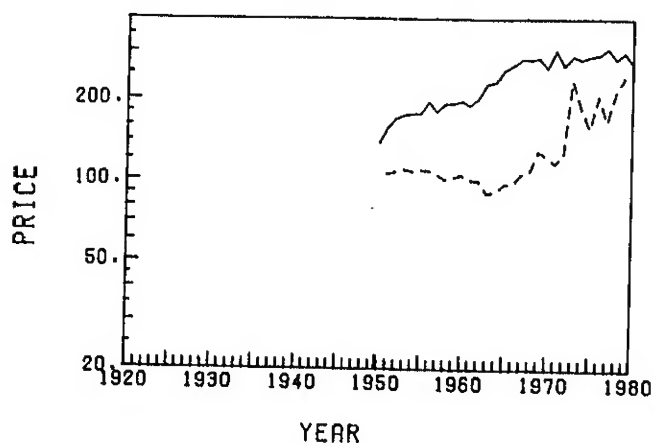
Figure 6.—Delivered veneer log prices for walnut and oak by state (1967 dollars per 1,000 board feet). (Ref. table A-7)



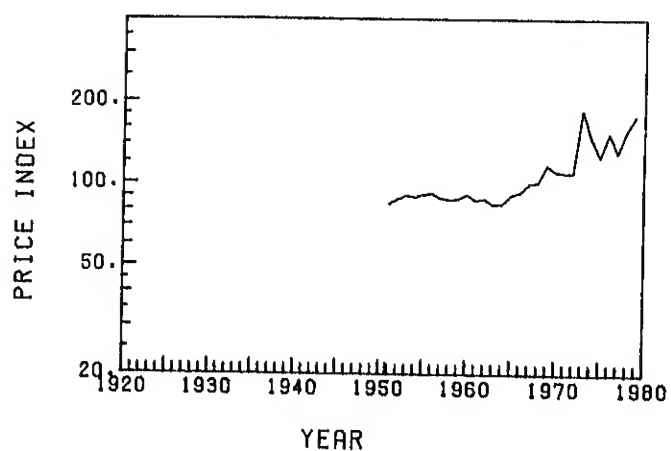
A. Delivered hardwood veneer logs from Wisconsin  
—Hard maple  
---Yellow birch



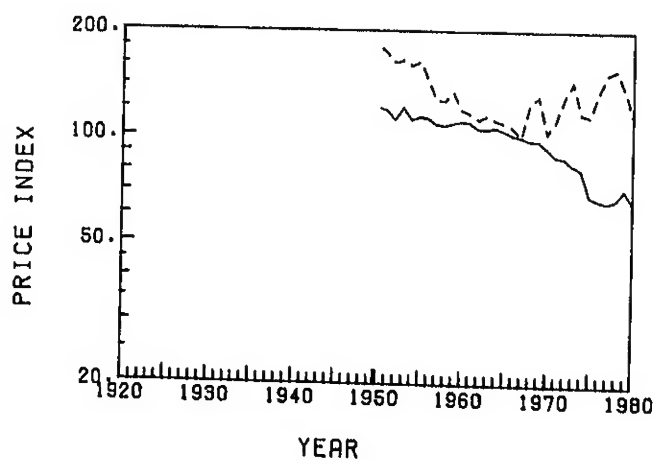
B. Delivered Louisiana gum sawlogs



C. Delivered veneer logs  
—Hardwoods  
---Douglas-fir



D. All delivered veneer log index



E. Plywood producer index  
—Hardwood plywood  
---Softwood plywood

Figure 7.—Prices of delivered veneer logs, Louisiana gum sawlogs and a plywood price index. (A-C: 1967 dollars per 1,000 board feet; D,E: deflated dollars, 1967 = 100). (Ref. tables A-7, A-8, A-9)

species produced in 1967. Softwoods represented by Douglas-fir received 89 percent of the weight. This aggregate index was virtually constant from 1951 to 1961. After the 1960 recession, through 1979, the aggregate price has increased at 4 percent per year (fig. 7D). This is somewhat faster than the aggregate delivered sawlog price increase rate over the same period, 3.5 percent per year (fig. 3E).

### Turpentine Prices

Turpentine is a relatively small component of the value of timber products produced. In 1967, the value of turpentine production was 0.6 percent of all timber commodities. Since 1930, turpentine price has been erratic and no consistent trend has been established (fig. 8A). From 1930 to 1978, prices have varied as much as 30 percent from a representative value of 70 cents per gallon. Since 1965, the price has cycled near 80 cents per gallon. Technology has changed dramatically in turpentine production. Formerly produced from gum turpentine, virtually all turpentine is now manufactured from tall oil, derived from pulping.

### Rosin Prices

Rosin production was valued at \$101 million in 1967 or approximately 3.6 percent of all timber commodities. Rosin price has increased fairly steadily since 1930 at about 2.3 percent per year (fig. 8B).

### Trends in Scarcity of Delivered Sawlogs, Pulpwood, and Veneer Logs

Aggregate delivered prices have been presented for pulpwood, sawlogs, and veneer logs. Each grouping represents different species, sizes, and qualities of trees. The aggregate indexes were constructed to measure the price of the 1967 mix of species produced. Where possible, price series for constant quality logs were used. Delivered prices, in addition to reflecting changes in stumpage price, also reflect changing logging and transportation expense. Approximate price increase rates for the aggregate series are shown in table 2. If trends in deflated prices are accepted as an indicator of scarcity, then the 1967 pulpwood mix has shown very little change in scarcity in recent years (fig. 8D). In contrast, sawlogs and veneer logs have shown marked changes in relative scarcity over the same period (fig. 8C, 8E). Scarcity increases were relatively modest from the postwar years to 1961. Since the 1960 recession, rates of scarcity increase have increased substantially. For both sawlogs and veneer logs, softwood scarcity increase rates have exceeded hardwood scarcity increase rates. Higher oil prices following the 1973 OPEC oil embargo do not seem to have changed the already rapid price increase rates established after 1960.

When the separate commodities are aggregated into a single timber commodities price index, the change in the scarcity increase rate after the 1960 recession is

Table 2.—Real delivered price increase rates

	1947(51)-1961	1961-1979
	Pct	Pct
Pulpwood	0.8	0*
Sawlogs		
Hardwoods	0	1.5
Softwoods	1.5	3.9
Veneer logs		
Hardwoods	1.9	2.5
Softwoods	-5	5.0

\* 1961-1978

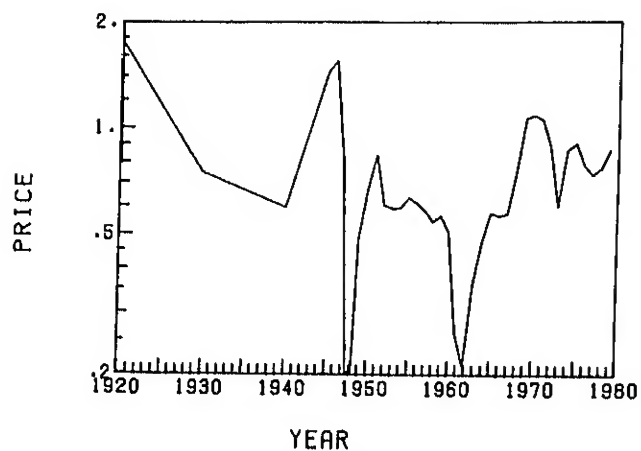
clear (fig. 8F). From 1961 to 1978, delivered timber commodities have been increasing in price at the rate of 2.5 percent per year. This is almost double the long-term price rate of increase, 1.4 percent per year, for all timber commodities from 1870 to 1973 (4, p. 97).

### Conclusions

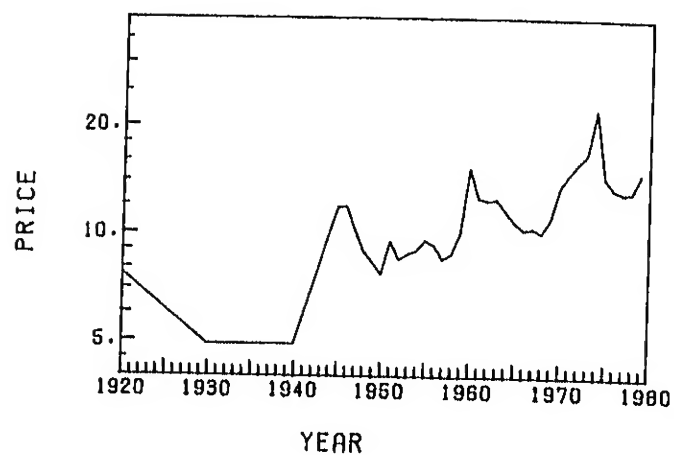
It appears that the many Forest Service projections of rising real prices ("timber shortages") have been valid for sawlogs and veneer logs. Economic scarcity has increased substantially for these commodities since 1961. It is not possible to conclude that slow physical production of timber has been the primary cause of price increases. Many demand factors as well as many supply factors combine to drive up prices. Demand is influenced by the general level of economic activity, adequacy of wood product substitutes, the efficiency of use by consumers, and many other factors. Supply is influenced by regional adequacy and price of all production inputs required to produce timber products, the technology available for harvesting, and the regional economic availability of timber. Establishment of price in a market is influenced by competition and the efficiency of the market. Efforts to moderate increasing scarcity of forest products should consider all opportunities to slow price increase rates.

### Literature Cited

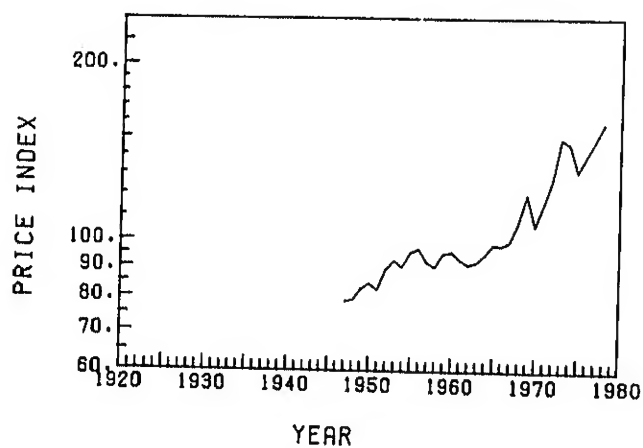
1. Barnett, H. J., and C. Morse.  
1963. Scarcity and growth, the economics of natural resource availability. Johns Hopkins Press, Baltimore, Md.
2. Fisher, A. C.  
1979. Measures of natural resource scarcity, in Scarcity and growth reconsidered. V. K. Smith, ed., Johns Hopkins University Press, Baltimore, Md.
3. Malthus, Thomas R.  
1798. An essay on the principle of population. 291 p. Penguin Books, Inc., Baltimore, Md.



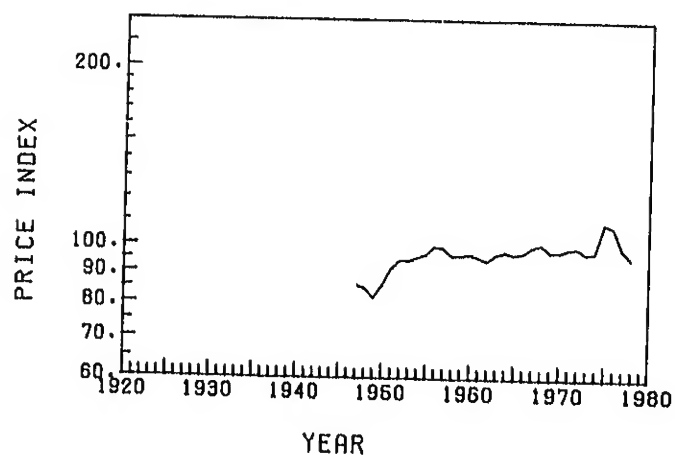
A. Turpentine (1967 dol/gal)



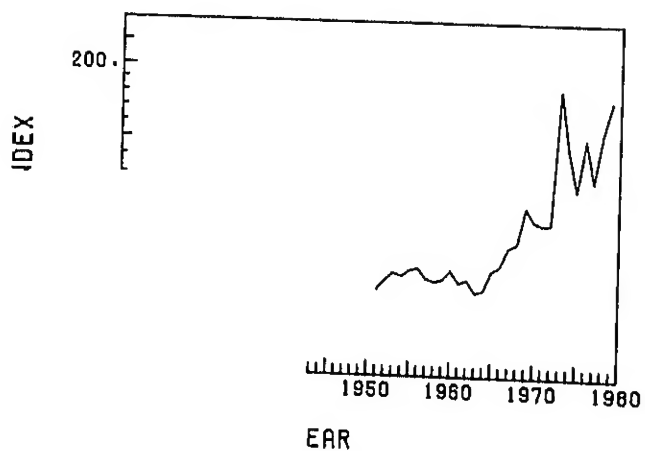
B. Rosin (1967 dol/100 wt)



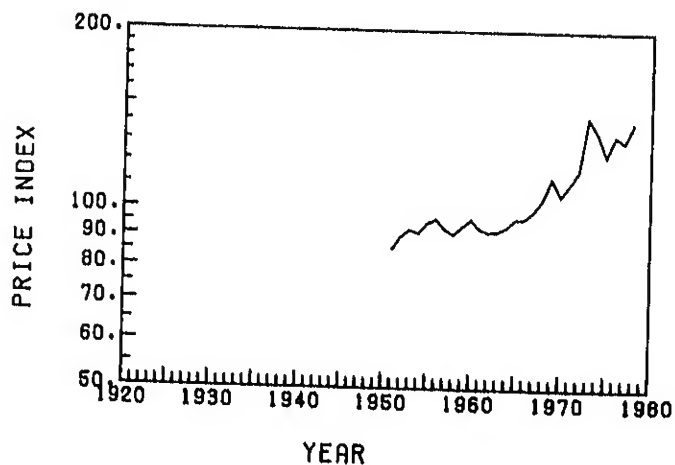
C. All sawlogs—delivered



D. All pulpwood—delivered



E. All sawlogs—delivered, Index



F. Forest commodities, Index

ommodities. (C-F; deflated dollars, 1967 = 100).

4. Manthy, R. S.  
1978. Natural resource commodities—A century of statistics. Johns Hopkins University Press, Baltimore, Md.
5. Mills, T. J., and R. S. Manthy.  
1974. An econometric analysis of market factors determining supply and demand for softwood lumber. Michigan State Univ., Agric. Exp. Stn. Res. Pap. No. 238, East Lansing, Mich.
6. Potter, N., and F. T. Christy, Jr.  
1962. Trends in natural resource commodities. Johns Hopkins University Press, Baltimore, Md.
7. Smith, V. K.  
1978. Scarcity and growth reconsidered. *Am. J. of Agric. Econ.* 60(2):284-289. May 1978.

### Additional References

- Demand and Price Situation.  
U.S. Department of Agriculture, Forest Service, The Demand and Price Situation for Forest Products (Washington: Government Printing Office, periodic).
- Illinois Timber Prices.  
Illinois Cooperative Crop Reporting Service, Timber Prices (Springfield: Illinois Cooperative Reporting Service, semiannual).
- Indiana Timber Price Report.  
Purdue University, Notes on Forestry and Wood Use (Lafayette: Cooperative Extension Service, Purdue University, annual).
- Louisiana Timber Products Quarterly Market Report.  
Louisiana Department of Agriculture, Louisiana Timber Products—Quarterly Market Report (Baton Rouge: State Market Commission, quarterly).

Natural Resource Commodities.  
Robert S. Manthy. 1978. Natural Resource Commodities—A Century of Statistics (Baltimore: Johns Hopkins University Press).

New Hampshire Forest Market Report.  
University of New Hampshire, New Hampshire Forest Market Report (Durham: Cooperative Extension Service, annual).

Producer Prices and Price Indexes.  
U.S. Department of Labor, formerly Wholesale Prices and Price Indexes (Washington: Bureau of Labor Statistics, monthly with annual supplements).

Production, Prices, Employment, and Trade.  
U.S. Department of Agriculture, Forest Service, Production, Prices, Employment, and Trade in Northwest Forest Industries (Portland: Pacific Northwest Forest and Range Experiment Station, periodic).

U.S. Timber Production, Trade, Consumption, and Price Statistics, 1950-80.  
U.S. Department of Agriculture, Forest Service. 1981. Misc. Pub. No. 1408.

The Timber Situation, 1952-2030.  
U.S. Department of Agriculture, Forest Service. 1980. An Analysis of the Timber Situation in the United States, 1952-2030.

Wisconsin Forest Products Price Review.  
University of Wisconsin Forestry Department, cooperative extension, and the U.S. Department of Agriculture, Wisconsin Forest Products Price Review. There are boltwood, timber, and lumber editions. (Madison: University of Wisconsin Cooperative Extension, semiannual).

## Appendix

**Table A-1.—Sawtimber stumpage prices for sawtimber from National forests (1967 dol/1,000 fbm)**

Date	Douglas- fir	Southern pine	Ponderosa pine	Eastern hardwoods
..... Dol/1,000 fbm .....				
1920	2.3	5.5	4.6	
1930	7.4	7.2	8.1	
1940	5.7	11.1	5.4	
1945	9.2	17.0	10.3	
1946	10.6	14.3	8.8	
1947	12.9	14.2	10.8	
1948	24.0	19.8	17.6	
1949	14.1	25.0	22.4	
1950	20.0	32.6	22.4	
1951	27.9	37.3	36.9	
1952	29.1	37.3	30.9	
1953	23.1	39.1	29.6	
1954	18.5	33.9	31.1	
1955	32.9	36.4	29.7	
1956	41.6	41.2	30.0	
1957	28.1	33.8	25.9	
1958	23.0	32.9	20.2	
1959	38.8	37.1	21.7	22.3
1960	33.7	36.4	20.1	24.0
1961	29.2	28.4	12.8	19.0
1962	26.2	27.4	17.0	19.6
1963	29.5	26.6	16.7	22.8
1964	40.2	29.4	20.1	23.8
1965	44.1	32.8	20.5	25.9
1966	50.1	38.7	19.8	29.4
1967	41.7	38.3	22.2	27.0
1968	59.7	46.0	29.5	23.0
1969	77.2	48.5	66.7	28.4
1970	38.0	39.9	29.1	24.4
1971	43.1	45.8	33.0	21.6
1972	60.2	55.1	55.2	28.8
1973	102.5	69.3	68.5	34.1
1974	126.4	47.6	62.8	28.7
1975	96.9	32.6	40.7	19.4
1976	96.3	47.5	55.6	19.1
1977	116.3	51.6	67.7	19.5
1978	119.6	64.3	78.7	19.6
1979	167.4	65.9	101.4	19.9
1980	160.8	57.8	76.7	19.5

**Sources:**

1920-1949: Demand and Price Situation, 1964, p. 33, table 5, current dollars deflated by the 1967 producer price index; 1950-1976: Demand and Price Situation, 1976-1977, p. 43, table 6; and 1977-1980: U.S. Timber Production, Trade, Consumption, and Price Statistics, 1950-80.

**Table A-2.—Delivered sawlog price indexes (deflated, 1967 = 100)**

Date	Softwood sawlog index	Hardwood sawlog index	All- sawlog index
1947	77.9	83.9	79.0
1948	79.0	81.4	79.4
1949	82.7	83.6	82.8
1950	85.2	82.9	84.7
1951	84.0	76.1	82.6
1952	91.0	82.8	89.4
1953	91.4	98.1	92.6
1954	91.7	85.3	90.4
1955	97.8	87.2	95.8
1956	99.4	87.2	97.1
1957	94.4	82.0	92.0
1958	92.2	82.2	90.3
1959	97.2	87.2	95.2
1960	98.8	84.0	96.0
1961	95.3	84.2	93.2
1962	92.3	86.2	91.2
1963	93.2	87.7	92.1
1964	95.9	90.0	94.8
1965	99.8	93.7	98.7
1966	98.7	97.1	98.4
1967	100.0	100.0	100.0
1968	110.2	98.0	107.9
1969	124.8	101.3	120.3
1970	108.2	97.2	106.2
1971	120.2	97.0	115.9
1972	132.9	101.9	127.1
1973	159.1	109.4	149.7
1974	156.3	106.0	146.8
1975	140.1	94.8	131.6
1976	150.2	97.4	140.3
1977	160.2	101.4	149.2
1978	171.0	106.8	159.0
1979	191.8	110.4	171.9

**Sources:**

Softwood Sawlog Index—1947-1979: A weighted average of delivered sawlog prices for selected softwood species and grades.

Hardwood Sawlog Index—1947-1979: A weighted average of delivered sawlogs for selected hardwood species.

All-Sawlog Index—1947-1979: A weighted average of softwood and hardwood indexes.

Notes for Table A-2:

Softwood Index—Deflated prices for 8 categories of delivered sawlogs were averaged after being weighted

by certain 1967 levels of lumber production. Sawlog price series and lumber production categories are:

<u>Sawlog price series</u>	<u>Lumber production category</u>	<u>Lumber production 1,000 fbm</u>	<u>Percentage of production Weight</u>
Louisiana southern pine	Southern yellow pine	6,511	29.2
Louisiana cypress	Other softwoods (south)	168	.8
Wisconsin red and white pine	White pine (east)	694	3.1
Wisconsin hemlock	Eastern hemlock (east)	209	1.0
Douglas-fir (No. 2)	Douglas-fir	8,226	36.9
Western redcedar (No. 2)	Western redcedar	391	1.7
Western white fir (No. 2)	Western white fir	2,273	10.2
Ponderosa pine (No. 2)	Ponderosa pine	3,788	17.0

Lumber production data source: U.S. Department of Commerce, Current Industrial Reports—Lumber Production, 1968 (contains revised 1967 production levels), tables 5-6.

Sawlog prices were deflated by the 1967 producer price index. The weighted average price series was converted to an index with 1967 = 100.

Price data sources: Prod., Prices, Emp., and Trade, Second Quarter 1978, tables 32, 33, 35, 37; Wisconsin For. Prod. Price Rev.; Louisiana Timber Prod. Quart. Mark. Rep.

Hardwood Index—Deflated prices for 19 categories of delivered hardwood sawlogs were averaged after being weighted by 1967 levels of hardwood lumber production. Sawlog price series and lumber production categories are:

<u>Sawlog price series</u>	<u>Lumber production category</u>	<u>Lumber production 1,000 fbm</u>	<u>Percentage of production Weight</u>
Louisiana:oak	Oak (south)	2,396	44.4
:gum	All gum (south)	712	13.2
:cottonwood	Cottonwood (south)	78	1.4
:ash	Ash (south)	97	1.8
Illinois and Wisconsin oak	Oak (north)	1,028	19.0
Illinois gum	Gum (north)	17	.4
Illinois and Wisconsin maple	Maple (north)	540	10.0
Illinois yellow-poplar	Yellow-poplar (north)	55	1.0
Illinois cottonwood, Wisconsin cottonwood and aspen	Cottonwood and aspen (north)	124	2.2
Illinois and Wisconsin basswood	Basswood (north)	48	1.0
Illinois beech	Beech (north)	89	1.6
Illinois and Wisconsin ash	Ash (north)	52	1.0
Wisconsin yellow birch	Birch (north)	74	1.4
Wisconsin beech	Beech (north)	89	1.6

Lumber production data source: U.S. Department of Commerce, Current Industrial Reports—Lumber Production, 1968 (contains revised 1967 production levels), tables 5-6.

Price data sources: Louisiana Timber Prod. Quart. Mark. Rep.; Wisconsin For. Prod. Price Rev.; Illinois Timber Prices.

Sawlog prices were deflated by the 1967 producer price index. The weighted average price series was converted to an index with 1967 = 100.

All-Sawlog Index—An all-sawlog price index was calculated by taking a weighted average of the hardwood and softwood sawlog indexes. Weights for the two indexes were calculated by multiplying 1967 lumber production times the 1967 deflated aggregate price for sawlogs represented in the softwood and hardwood price series. Prices, production levels, and price weights are:



Notes for Table A-2 (continued):

<u>Sawlog category</u>	<u>1967 Deflated sawlog price</u> <u>1967 Dol/fbm</u>	<u>1967 Lumber production</u> <u>1,000 fbm</u>	<u>Price weight</u> <u>Million dollars</u>
Hardwoods	60.9	7.4	450.7 (24.4 pct)
Softwoods	51.1	27.3	1,395.0 (75.6 pct)

The all-sawlog price index is intended to estimate the change in deflated price required to purchase the 1967 level of sawlog production represented in the softwood and hardwood price series.

Lumber production data source: Demand and Price Situation, 1976-1977, p. 66.

Table A-3.—Lumber price indexes (deflated prices, 1967 = 100)

<u>Date</u>	<u>Softwood lumber</u>	<u>Hardwood lumber</u>	<u>All lumber</u>
1930			51.3
1940			67.7
1945			75.5
1946			75.8
1947			95.9
1948			101.4
1949			98.7
1950	107.7	100.4	109.2
1951	104.9	96.8	106.7
1952	107.4	91.6	106.5
1953	106.6	94.7	107.9
1954	104.8	92.5	105.7
1955	111.3	97.6	110.6
1956	108.6	100.4	108.6
1957	99.2	92.5	100.2
1958	96.0	91.2	97.7
1959	104.1	94.8	104.2
1960	97.7	95.7	100.4
1961	93.0	91.2	96.3
1962	95.0	90.7	96.6
1963	97.5	94.0	98.9
1964	98.5	97.4	100.7
1965	96.4	100.8	99.3
1966	97.9	108.9	100.3
1967	100.0	100.0	100.0
1968	117.7	101.8	114.5
1969	126.2	112.8	123.5
1970	102.7	103.9	103.0
1971	123.8	99.6	119.0
1972	140.8	106.0	133.8
1973	159.1	124.0	152.3
1974	132.0	118.4	129.4
1975	114.7	91.7	110.1
1976	135.6	96.2	127.3
1977	153.1	103.1	142.4
1978	165.3	112.7	154.0
1979	161.3	110.4	150.4
1980	128.4	93.8	121.2

Sources:

Softwood and Hardwood Lumber—1950-1976: Demand and Price Situation, 1976-1977, p. 69, table 24, relative price; 1977-1980: Producer Prices and Price Indexes, deflated by all commodity producer price index.

All Lumber—1930-1949: Demand and Price Situation, 1964, p. 38, table 10, relative price converted to 1967 dollars; 1950-1976: Demand and Price Situation, 1976-1977, p. 69, table 24, relative price; 1977-1980: Producer Prices and Price Indexes, deflated by all commodity producer price index.

Table A-4.—Pulpwood stumpage prices (1967 dol/cord)

Date	Louisiana southern pine	Louisiana hardwoods	Wisconsin pine	Wisconsin spruce	Wisconsin hemlock	Wisconsin aspen	New Hampshire spruce and fir	New Hampshire hemlock
1950			4.6	6.7	2.8	2.3	4.9	2.1
1951			6.3	8.8	5.2	4.5	4.4	2.5
1952			5.9	7.9	3.3	2.7		
1953			5.1	7.2	3.3	2.7		
1954			5.8	7.4	3.4	2.7		
1955	3.9		5.1	8.9	2.6	3.5		
1956	4.2	1.8	6.3	7.8	3.9	2.6	4.4	2.2
1957	4.6	1.7	6.1	7.8	3.6	2.6	4.3	2.1
1958	4.5	1.7	5.0	8.3	4.4	2.6		
1959	4.5	1.8	5.7	8.1	4.6	2.8		
1960	4.6	1.7	5.3	7.6	4.2	3.1	4.5	2.1
1961	4.5	1.6	5.8	8.5	4.2	2.1	5.3	1.3
1962	4.5	1.6	5.4	8.7	4.4	2.6	4.7	1.8
1963	4.6	1.6	5.6	8.5	4.5	2.4	4.8	1.9
1964	4.5	1.7					4.8	2.1
1965	4.6	1.7					4.7	2.1
1966	4.6	1.7					5.3	3.0
1967	4.6	1.7	6.1	7.2	4.4	2.2	5.2	1.7
1968	4.5	1.8	5.4	7.9	4.8	2.7	5.1	1.7
1969	4.4	1.8	5.6	7.0	5.0	2.8	4.2	1.9
1970	4.3	1.8	5.9	6.4	4.3	2.7	4.1	1.8
1971	4.2	1.7	5.8	5.2	4.0	2.5	4.0	2.2
1972	4.0	1.8	5.4	5.0	3.2	2.4	3.8	2.1
1973	3.9	1.8	4.5	5.6	3.8	2.3	4.1	2.2
1974	3.7	1.6					3.4	1.9
1975	3.7	1.6	4.0	4.6	2.9	2.1	3.4	1.7
1976	3.7	1.5	4.3	4.5	2.7	1.9	3.6	1.6
1977	3.7	1.5	4.1	3.5	3.5	1.7	3.3	1.5
1978	3.8	1.5	4.4	3.7	2.5	1.5	3.3	1.4
1979	4.0	1.6	4.9	3.7	2.4	2.1	3.4	1.6
1980	3.8	1.5	5.2	3.3	3.2	2.4	3.0	1.9

## Sources:

1950-1976: Demand and Price Situation, 1976-1977,  
p. 83, table 33, relative prices; 1976-1980: Louisiana  
Timber Prod. Quart. Mark. Rep., Wisconsin For. Prod.  
Price Rev., New Hampshire For. Mark. Rep.

Table A-5.—Pulpwood delivered prices (1967 dol/cord)

Date	Southern pine	Wisconsin pine	Wisconsin spruce	Wisconsin aspen	Southern hardwoods	Western softwood logs	Western softwood chips
1945	15.4		27.5	17.6			
1946	16.2		26.5	16.1			
1947	14.4		31.0	15.0		19.2	
1948	14.1		26.9	14.5			
1949	14.0		23.5	11.8			14.5
1950	14.7	17.4	25.1	12.8			14.7
1951	15.4	20.0	28.8	16.5		19.1	15.0
1952	15.9	21.4	30.6	15.7			15.2
1953	16.1	20.7	28.3	14.7			15.8
1954	16.2	20.3	29.1	14.2			15.8
1955	16.4	19.9	29.3	14.2			16.1
1956	16.7	20.1	29.9	14.9		23.7	16.3
1957	16.2	19.2	29.6	13.7	13.8	21.8	16.6
1958	16.0	18.2	29.1	12.9	13.6	22.9	16.9
1959	16.4	19.8	29.3	13.6	13.7	20.5	16.6
1960	16.6	18.6	29.2	13.7	13.6	20.9	16.3
1961	16.6	19.0	28.8	13.8	13.6	20.2	16.0
1962	16.5	19.0	28.5	13.4	13.5	20.1	15.8
1963	16.8	18.8	27.2	14.6	13.8	20.2	16.5
1964	16.9	19.4	28.3	15.0	14.0	20.4	16.5
1965	17.1	20.0	28.8	15.3	14.4	19.5	14.6
1966	17.4	20.7	28.9	15.3	14.9	19.3	13.8
1967	17.6	21.4	29.9	15.7	15.2	18.4	15.4
1968	17.8	20.9	27.6	15.6	15.2	18.8	16.0
1969	17.9	19.6	26.8	15.0	15.8	16.3	14.9
1970	17.4	21.0	26.5	14.5	15.6	16.5	15.8
1971	17.0	20.0	25.0	14.0	15.3	22.1	17.6
1972	17.6	19.4	25.1	13.6	15.8	21.6	17.0
1973	18.4	19.4	22.8	13.8	15.9	15.0	14.3
1974	18.6	18.1	22.6	13.3	15.5	19.3	19.0
1975	17.2	16.9	23.7	13.7	14.6	30.3	26.9
1976	17.1	20.2	22.8	13.8	14.1	28.0	24.6
1977	16.8	19.8	20.8	13.3	14.0	19.9	19.5
1978	16.6	18.0	18.4	12.4	13.8	18.6	18.0
1979	15.1	17.5	20.5	12.8	13.6		
1980		16.7	18.2	12.8			

## Sources:

**Southern Pine**—1945-1949: Demand and Price Situation, 1964, p. 43, table 16, average of southeast and mid-south prices deflated by the 1967 producer price index; 1950-1976: Demand and Price Situation, 1976-1977, p. 81, table 32, average of mid-south, southeast, and Louisiana prices deflated by the 1967 producer price index; 1977-1979: U.S. Timber Production, Trade, Consumption, and Price, 1950-1980, average of mid-south, southeast, and Louisiana prices, 1967 dollars.

**Wisconsin Pine**—1950-1976: Demand and Price Situation, 1976-1977, p. 82, table 32, 1967 dollars; 1977-1980: Wisconsin For. Prod. Price Rev.

**Wisconsin Spruce and Aspen**—1945-1949: Demand and Price Situation, 1964, p. 43, table 16, price deflated by 1967 producer price index; 1950-1976: Demand and Price Situation, 1976-1977, p. 82, table 32, 1967 dollars; 1977-1980: Wisconsin For. Prod. Price Rev.

**Southern Hardwoods**—1957-1975: Demand and Price Situation, 1976-1977, p. 81, table 32, average of mid-south, southeast, and Louisiana, 1967 dollars; 1976-1979: U.S. Timber Production, Trade, Consumption, and Price, 1950-1980, average of mid-south, southeast, and Louisiana prices, 1967 dollars.

**Western Pulpwood Logs**—1947-1976: Prod., Prices, Emp., and Trade, Third Quarter 1977, p. 16, table 9, average log price, deflated by 1967 producer price index; 1977-1978: Northwest Pulp and Paper Assoc. Economic Survey, 1947, 1951, 1956-78. Seattle, Wash. Figures exclude Weyerhaeuser Corp.

**Western Pulpwood Chips and Residues**—1947-1976: Prod., Prices, Emp., and Trade, Third Quarter 1977, p. 16, table 9, average price, deflated by 1967 producer price index; 1977-1978: Northwest Pulp and Paper Assoc. Economic Survey, 1947, 1951, 1956-78. Seattle, Wash. Figures exclude Weyerhaeuser Corp.

**Table A-6.—Woodpulp price index (deflated price, 1967 = 100)**

Date	Woodpulp producer price index	Date	Woodpulp producer price index
1950	99.0	1965	103.5
1951	106.4	1966	100.2
1952	106.7	1967	100.0
1953	105.7	1968	97.6
1954	106.2	1969	93.9
1955	109.0	1970	99.0
1956	110.0	1971	98.3
1957	107.9	1972	93.6
1958	108.7	1973	95.2
1959	108.4	1974	136.0
1960	107.7	1975	162.0
1961	102.5	1976	156.4
1962	100.3	1977	144.7
1963	99.0	1978	127.3
1964	103.6	1979	133.4
		1980	141.5

**Sources:**

1950-1976: Demand and Price Situation, 1976-1977,  
p. 70, table 24, relative price index; 1977-1980:  
Producer Prices and Price Indexes, deflated by the  
1967 producer price index.

Table A-7.—Delivered hardwood veneer log prices (1967 dol/1,000 fbm)

Date	Wisconsin hard maple	Wisconsin yellow birch	Wisconsin white and red oak	Wisconsin walnut	Illinois walnut	Illinois white oak	Indiana walnut	Louisiana gum
1950	116.1	162.0	96.3	213.9	(145.5)	(159.5)	(145.5)	(36.7)
1951	101.5	192.1	89.2	252.5	(203.1)	(131.2)	(203.1)	(32.6)
1952	98.8	211.6	93.1	279.3	(210.8)	(137.1)	(210.8)	(35.0)
1953	103.0	211.7	99.0	308.9	168.2	142.0	(300.0)	(35.8)
1954	102.7	205.5	99.9	313.9	234.6	156.5	(315.6)	(35.4)
1955	95.7	207.9	96.8	326.0	254.0	123.5	(336.0)	(35.3)
1956	115.8	239.8	92.1	371.6	251.4	87.0	(344.0)	37.8
1957	115.2	211.7	87.1	375.1	219.7	102.0	(342.8)	37.0
1958	115.2	229.9	84.6	382.7	281.2	116.5	320.1	37.6
1959	121.3	217.8	98.9	382.4	289.6	112.3	440.4	39.3
1960	125.4	223.9	94.2	443.8	294.7	108.5	395.2	40.0
1961	127.0	211.6	95.2	469.8	300.0	105.0	357.1	39.2
1962	123.9	211.0	98.9	501.1	326.5	100.0	556.4	42.1
1963	124.3	232.8	94.2	616.9	443.9	84.5	672.0	42.3
1964	128.0	235.6	100.0	696.1	432.4	80.5	648.9	43.8
1965	131.9	238.3	106.1	785.4	542.0	174.5	789.7	46.3
1966	135.9	241.1	112.6	886.2	604.0	103.0	905.3	49.3
1967	140.0	244.0	119.5	1,000.0	637.5	161.5	937.0	48.9
1968	132.7	209.8	116.0	1,122.0	780.5	202.5	1,138.5	47.5
1969	132.9	196.2	99.3	1,056.3	845.0	182.0	1,256.8	49.0
1970	138.5	178.0	115.5	634.1	826.5	181.0	1,415.3	47.1
1971	128.5	182.0	114.9	1,163.3	841.5	203.0	1,443.4	47.5
1972	153.0	178.5	124.3	734.7	803.5	194.0	1,337.1	48.2
1973	128.5	142.5	107.1	1,519.3	634.0	231.0	1,617.3	49.4
1974	127.8	136.9	103.1	1,559.5	790.0	234.0	1,298.3	51.3
1975	127.0	131.5	99.3	1,600.9	663.0	231.5	1,558.	45.7
1976	133.5	136.6	208.3	1,530.1	685.0	271.0	1,470.	47.4
1977	133.5	182.2	172.0	1,193.9	695.0	341.0	1,422.	46.7
1978	143.5	156.5	150.5	800.3	783.5	427.0	1,347.	48.6
1979	141.0	148.5	181.7	1,177.8	820.0	470.5	1,419.	49.4
1980	132.0	111.0	(146.0)	(1,080.3)	879.5	435.5	1,533.	47.0

es in parentheses are estimates.

Table A-8.—Delivered veneer price index worksheet

Date	Veneer and plywood production	Veneer log production	Veneer log Conversion	Hardwood veneer log average price	Average Douglas-fir veneer log price	Average veneer price	Veneer price index (1967 = 100)
	<u>Million ft<sup>3</sup></u>	<u>Million fbm</u>	<u>ft<sup>3</sup>/fbm</u>	<u>1967 dol/</u> <u>1,000 fbm</u>	<u>1967 dol/</u> <u>1,000 fbm</u>	<u>1967 dol/</u> <u>1,000 ft<sup>3</sup></u>	
1950	345.0			138.5	109.3		
1951	390.	2,271.0	0.172	157.7	105.9	649.4	84.2
1952	435.	2,537.	.171	170.7	108.4	674.4	87.4
1953	475.	2,815.	.169	175.5	110.2	695.0	90.1
1954	480.	2,846.	.169	177.4	108.2	685.7	88.9
1955	575.	3,433.	.167	178.1	109.7	702.3	91.1
1956	590.	3,513.	.168	195.9	109.3	707.8	91.8
1957	560.	3,332.	.168	180.3	105.8	679.0	88.0
1958	615.	3,713.	.166	193.0	101.2	671.0	87.0
1959	720.	4,350.	.166	194.0	102.4	678.1	87.9
1960	705.	4,276.	.165	198.0	105.5	701.6	91.0
1961	765.	4,628.	.165	191.0	100.4	669.4	86.8
1962	800.	4,854.	.165	203.0	100.2	676.4	87.7
1963	870.	5,308.	.164	229.6	90.2	644.3	83.6
1964	960.	5,845.	.164	233.7	90.7	649.8	84.3
1965	1,030.	6,275.	.164	258.6	97.2	701.9	91.0
1966	1,030.	6,315.	.163	269.5	97.7	716.4	92.9
1967	1,030.	6,305.	.163	284.3	105.9	771.2	100.0
1968	1,120.	6,880.	.163	283.1	108.3	783.5	101.6
1969	1,050.	6,430.	.163	286.8	129.3	900.5	116.8
1970	1,020.	6,250.	.163	262.5	123.7	853.4	110.7
1971	1,175.	7,215.	.163	305.4	116.4	842.8	109.3
1972	1,300.	7,815.	.166	267.4	125.0	846.5	109.8
1973	1,320.	7,750.	.170	291.1	237.9	1,434.1	186.0
1974	1,150.	6,560.	.175	282.5	186.9	1,128.6	146.3
1975	1,165.	6,535.	.178	291.6	158.9	965.4	125.2
1976	1,355.	7,415.	.183	294.5	206.4	1,181.3	153.2
1977	1,425.	7,805.	.182	311.4	165.9	1,000.3	129.7
1978	1,460.	8,005.	.182	283.7	213.3	1,214.9	157.5
1979	1,395.	7,655.	.182	300.2	242.5	1,367.6	177.3
1980				271.0			

## Sources:

Veneer and Plywood Production—1950-1976: Demand and Price Situation, 1976-1977, p. 39, table 2, domestic production; 1977-1979: U.S. Timber Production, Trade, Consumption, and Price Statistics, 1950-1980.

Veneer Log Production—1951-1973: Demand and Price Situation, 1976-1977, p. 88, table 39, all species; 1974-1979: U.S. Timber Production, Trade, Consumption, and Price Statistics, 1950-1980.

Veneer Log Conversion—1951-1979: Column 1 divided by column 2.

Average Hardwood Veneer Log Price—1950-1980: A weighted average of 8 delivered veneer log prices contained in table A-7. See notes.

Average Douglas-Fir Veneer Log Price—<sup>1</sup>  
Demand and Price Situation, 1976-1977  
table 40, average  
U.S. Timber Price  
Price

Notes for Table A-8:

Hardwood Veneer Log Price—Delivered veneer log deflated prices contained in table A-7 were averaged after being weighted by 1967 U.S. plywood production quantities. Veneer log price categories, plywood production categories, and production weights are:

Veneer log price series	Plywood production category	Plywood production <u>1,000 ft<sup>2</sup></u>	Percentage of production
Wisconsin hard maple	Maple	70,514	5.9
Wisconsin yellow birch	Birch	627,705	52.4
Simple average of Wisconsin red and white oak, and Illinois white oak	Oak	167,082	14.0
Simple average of Wisconsin walnut, Illinois walnut, and Indiana walnut	Walnut	169,239	14.2
Louisiana gum	Gum	161,071	13.5

Plywood Production Data Source—U.S. Department of Commerce, Current Industrial Reports—Hardwood Plywood, 1968 (contains revised 1967 production levels), table 3, total of veneer core-type II and board core plywood production.

Price Data Sources—Wisconsin For. Prod. Price Rev.; Louisiana Timber Prod. Quart. Mark. Rep.; Illinois Timber Prices; Indiana Timber Price Rep.

Veneer log prices were deflated by 1967 producer price index. Oak prices for Wisconsin and Illinois were averaged to obtain a single oak price. Wisconsin, Illinois, and Indiana walnut prices were averaged to obtain a single walnut price.

Table A-9.—Plywood price indexes (deflated index, 1967 = 100)

Date	Hardwood plywood producer price index	Softwood plywood producer price index	All-plywood producer price index
1947			143.0
1948			150.1
1949			138.0
1950	121.0	180.9	148.5
1951	118.9	172.9	144.2
1952	111.6	162.0	135.2
1953	121.1	164.8	142.8
1954	111.9	159.0	134.4
1955	114.1	163.2	137.1
1956	112.8	144.7	127.9
1957	108.6	127.1	117.9
1958	107.8	126.3	117.2
1959	109.5	134.3	121.8
1960	110.9	119.3	115.5
1961	109.8	116.4	113.5
1962	105.6	112.1	109.3
1963	105.4	115.2	110.9
1964	106.4	111.5	109.3
1965	104.0	109.4	107.1
1966	101.5	106.3	104.2
1967	100.0	100.0	100.0
1968	98.0	126.0	112.9
1969	97.7	130.7	115.0
1970	93.2	102.9	98.2
1971	88.4	111.7	100.7
1972	87.6	130.1	109.7
1973	83.7	144.0	115.2
1974	81.3	116.7	100.6
1975	68.3	114.7	92.2
1976	66.9	135.3	102.2
1977	65.8	152.3	109.3
1978	67.0	155.9	112.6
1979	71.8	136.8	106.3
1980	65.7	114.9	91.7

Sources:

Plywood Price Indexes—1950-1976: Demand and Price Situation, 1976-1977, p. 68, table 23, all hardwood plywood, all softwood plywood, and all plywood, each deflated by the 1967 producer price index; 1977-1980: Producer Prices and Price Indexes, series for hardwood, softwood, and all plywood, each deflated by the 1967 producer price index.

Table A-10.—Forest products prices (1967 dollars)

Date	Sawlogs	Pulpwood	Veneer	Turpentine	Rosin	Forest commodities deflated price index (1967 = 100)
	<u>Dol/</u> <u>1,000 fbm</u>	<u>Dol/cord</u>	<u>Dol/</u> <u>1,000 ft<sup>3</sup></u>	<u>Dol/gal</u>	<u>Dol/cwt</u>	
1920				1.750	7.7	
1930				.747	4.9	
1940				.593	4.9	
1945				1.449	11.9	
1946				1.552	11.9	
1947	40.4	14.7		.820	10.2	
1948	40.7	14.5		.117	8.9	
1949	42.4	14.0		.488	8.3	
1950	43.4	14.7		.674	7.7	
1951	42.3	15.7	649.1	.838	9.5	86.0
1952	45.8	16.2	674.4	.603	8.5	90.3
1953	47.4	16.2	695.0	.590	8.8	92.5
1954	46.3	16.4	685.7	.592	9.0	91.5
1955	49.0	16.6	702.3	.633	9.6	95.1
1956	49.7	17.1	707.8	.612	9.3	96.6
1957	47.1	17.0	679.0	.582	8.5	92.9
1958	46.2	16.5	671.0	.542	8.8	91.1
1959	48.7	16.5	678.1	.563	10.1	94.0
1960	49.2	16.6	701.6	.505	15.3	96.6
1961	47.7	16.4	669.4	.261	12.6	93.1
1962	46.7	16.2	676.4	.212	12.4	91.9
1963	47.2	16.6	644.3	.356	12.5	92.2
1964	48.5	16.8	649.8	.475	11.6	93.8
1965	50.5	16.6	701.9	.575	10.8	96.8
1966	50.4	16.7	716.4	.563	10.3	97.0
1967	51.2	17.1	771.2	.574	10.4	100.0
1968	55.2	17.3	783.5	.759	10.1	104.6
1969	61.6	16.8	900.5	1.069	11.1	113.6
1970	54.4	16.8	853.4	1.087	13.6	106.1
1971	59.3	17.0	842.8	1.054	14.8	111.1
1972	65.1	17.1	846.5	.878	15.9	116.9
1973	76.6	16.7	1,434.1	.598	16.9	143.7
1974	75.2	16.8	1,128.6	.868	22.4	135.8
1975	67.4	18.8	965.4	.906	14.4	
1976	71.8	18.5	1,181.3	.780	13.4	
1977	76.4	17.0	1,000.3	.734	13.1	
1978	81.4	16.4	1,214.9	.769	13.2	
1979	88.0		1,367.6	.864	14.9	

## Sources:

Sawlogs—1947-1979: The all-sawlog Index from table A-2 was multiplied by 0.512 to approximate the all-sawlog price series given in table FP 1, col. 1 of Nat. Res. Commod.—A Century of Statistics. The two series are linked at 1967 when the price was \$51.2/1,000 fbm.

Pulpwood—1947-1949: Pulpwood prices from table A-5 for southern pine, aspen, and western softwoods were averaged using 1967 production weights shown in the notes; 1950-1956: Pulpwood prices from table



Sources for Table A-10 (continued):

Index; 1966-1976: Demand and Price Situation, 1976-1977, p. 94, table 44, average price, deflated by the 1967 producer price index; 1977-1979: U.S. Timber Production, Trade, Consumption, and Price Statistics, 1950-1980.

Rosin—1920-1965: Nat. Res. Commod., p. 90, table FP 1, col. 5, deflated by the 1967 producer price index; 1966-1976: Demand and Price Situation, 1976-1977, p. 94, table 44, average price, deflated by the 1967 producer price index; 1977-1979: U.S. Timber Production, Trade, Consumption, and Price Statistics, 1950-1980.

Forest Commodities Index—1951-1978: Other columns were weighted by their 1967 level of production, then totaled to obtain an aggregate price. This series was converted to an index by dividing by the 1967 value of production, then multiplying by 100. Production weights and sources are:

Sawlogs: 34.7 billion fbm, 1967 lumber production, Demand and Price Situation, 1976-1977, p. 66, table 22.

Pulpwood: 57.5 million cords, 1967 pulpwood production, Demand and Price Situation, 1976-1977, p. 79, table 30.

Veneer: 1,030 million ft<sup>3</sup>, 1967 veneer and plywood production, Demand and Price Situation, 1976-1977, p. 39, table 2.

Turpentine: 31.397 million gallons, 1967 production, Demand and Price Situation, 1976-1977, p. 94, table 44.

Rosin: 9.7173 million cwt, 1967 production, Demand and Price Situation, 1976-1977, p. 95, table 45.

duction Weights and Their Sources—All  
; 1967 levels of production found in De-  
Price Situation, 1976-1977, p. 80, table 31.

1967 Production (million cords)

25.9 (softwoods in the south)  
4.4 (softwoods in the north)  
5.8 (hardwoods in the north)  
7.7 (hardwoods in the south)  
13.6 (softwoods in the west)

Table A-11.—Domestic production of industrial roundwood for products (million ft<sup>3</sup>; roundwood equivalent)

Date	Total	Lumber	Plywood and veneer	Pulp products
1920	7,770	5,440	80	360
1930	6,305	4,560	155	395
1940	6,975	4,845	235	930
1945	6,600	4,365	250	1,140
1946	7,700	5,295	255	1,260
1947	8,085	5,500	275	1,370
1948	8,360	5,750	290	1,470
1949	7,340	5,000	320	1,275
1950	8,525	5,905	345	1,500
1951	8,740	5,780	390	1,825
1952	8,775	5,820	435	1,810
1953	8,790	5,710	475	1,910
1954	8,755	5,635	480	1,960
1955	9,225	5,785	575	2,200
1956	9,620	5,920	590	2,475
1957	8,615	5,100	560	2,350
1958	8,530	5,160	615	2,165
1959	9,390	5,745	720	2,355
1960	8,920	5,080	705	2,575
1961	8,750	4,945	765	2,475
1962	9,040	5,120	800	2,565
1963	9,575	5,355	870	2,670
1964	10,185	5,635	960	2,865
1965	10,555	5,665	1,030	3,095
1966	10,665	5,630	1,030	3,190
1967	10,435	5,325	1,030	3,190
1968	11,060	5,545	1,120	3,385
1969	11,030	5,415	1,050	3,585
1970	11,105	5,215	1,020	3,835
1971	11,035	5,385	1,175	3,560
1972	11,440	5,535	1,300	3,520
1973	11,925	5,670	1,320	3,755
1974	11,540	5,095	1,150	4,220
1975	10,570	4,890	1,165	3,485
1976	11,815	5,475	1,355	3,805
1977	11,965	5,730	1,425	3,645
1978	12,240	5,825	1,460	3,745
1979	12,525	5,680	1,395	4,090

Sources:

1920-1960: Demand and Price Situation, 1964, p. 27, table 2, domestic production of industrial roundwood for products; 1961-1979: U.S. Timber Production, Trade, Consumption, and Price Statistics, 1950-1980.

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Forest Products Laboratory

Trends in Economic Scarcity of U.S. Timber  
Commodities, by Kenneth Skog and Christopher Risbrudt,  
Madison, Wis., FPL 1982.  
25 p. (USDA For. Serv. Resource Bull. FPL 11)

Presents information on changes in real prices (prices  
deflated by general producer price index) of timber  
commodities as potential indicators of economic scarcity.

Keywords: Real prices, natural resources, economic  
demand, stumpage, sawlogs, pulpwood, veneer logs,  
plywood, lumber.

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